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BULLETIN

OF THE

TORREY BOTANICAL C[illegible]

Editor

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Vol. 51 No. 5

BULLETIN
OF THE
TORREY BOTANICAL CLUB

MAY, 1924

The Section Tuberarium of the Genus Solanum in Mexico and Central America: Concluding Paper

PER AXEL RYDBERG

2. PINNATISECTA

Fruit globose; plant not glandular.
- Leaf-segments distinctly stalked; calyx-lobes broadly deltoid, as broad as long (except in *S. brachistotrichum*).
  - Leaf-segments of an ovate or cordate type, rounded, obtuse, or merely acute at the apex. . 12. *S. cardiophyllum.*
  - Leaf-segments of a lanceolate type, acuminate.
    - Calyx 5 mm. long; corolla fully 1 cm. long; leaflets 9–11 . . . . . 13. *S. sambucinum.*
    - Calyx 2.5–4 mm. long; corolla 8–9 mm. long; leaflets 7–9.
      - Calyx-lobes broadly triangular, shorter than the tube.
        - Leaves glabrous above, glabrous or slightly pruinose beneath. . . . . 14. *S. lanciforme.*
        - Leaves pubescent on both sides, segments short petioluled. . . . . 15. *S. Ehrenbergii.*
      - Calyx-lobes lanceolate, fully as long as the tube; leaves puberulent on both sides. . . . 16. *S. brachistotrichum.*
- Leaflets sub-sessile, decurrent on the rachis.
  - Calyx-lobes lanceolate, as long as or longer than the tube; plant 3–5 dm. high.
    - Leaf-segments lanceolate, usually 7 or more.
      - Corolla more or less crisp-hirsute without; leaves hirsute on both sides; pedicels articulate above the middle. . . . . 17. *S. nayaritense.*
      - Corolla glabrous or puberulent.
        - Inflorescence more or less hairy; leaf-segments mostly 5–9; pedicels articulate near the middle.

[The BULLETIN for April (**51**: 127–165) was issued May 17, 1924.]

Leaves glabrate or with a few scattered hairs; calyx glabrous; corolla 8–10 mm. long	18. *S. Jamesii.*
Leaves decidedly pubescent, especially above; calyx sparingly hirsute; corolla about 12 mm. long	19. *S. michoacanum.*
Inflorescence and calyx glabrous or nearly so; leaf-segments 9–15; pedicels articulate above the middle	20. *S. pinnatisectum.*
Leaf-segments lance-linear, usually 5	21. *S. stenophyllidium.*
Calyx-lobes triangular, shorter than the tube; plant 1–2 dm. high	22. *S. nicaraguense.*
Fruit ellipsoid; upper part of the stem, the peduncle, and its branches more or less glandular with stipitate hairs	23. *S. polyadenium.*

12. SOLANUM CARDIOPHYLLUM Lindl. Jour. Hort. Soc. **3**: 70, 71. 1847.

S. cardiophyllum oligozygum Bitter, Repert. **11**: 439. 1912.
S. cardiophyllum pliozygum Bitter, *l. c.*

With the more numerous specimens before me, I think that the varieties proposed by Bitter are of little value. Bitter cited altogether only three specimens. The type of the first variety was a cultivated specimen raised from seeds of Uhde's collection, probably from the very type collection of *S. cardiophyllum*. *Schmiz 670* was also cited, with the remark that it verges towards the var. *pliozygum*. The only specimen cited under the second variety is *Pringle 6421*. The specimen of this number in the Columbia University herbarium has only 2 or 3 pairs of leaf-segments, and does in no way differ essentially from the other specimens.

ZACATECAS: *Palmer 593, 376; Rose 2784.*

AGUASCALIENTES: *Rose & Hay 6225.*

HIDALGO: *Pringle 13138.*

SAN LUIS POTOSI: *Parry & Palmer 633* (in part, Columbia Univ.).

MEXICO (Federal District): *Rose & Hay 5975; Pringle 6421.*

PUEBLA: *Purpus 3365, 3364.*

There is one collection from Querétaro, *Rose & Rose 11183* (represented in the U. S. Nat. Herb. and herbarium N. Y. Bot. Gard.), which has larger, fully 1 cm. long, purple-tinged corollas and the leaves decidedly pubescent beneath. This may represent a distinct species closely related to *S. cardiophyllum*, though more material is needed.

13. **Solanum sambucinum** Rydberg sp. nov.

A perennial, with subterranean stolons and tubers; stem herbaceous, perhaps 5 dm. high, angled, with scattered several-celled hairs; leaves odd-pinnatifid, about 1.5 dm. long; rachis wing-margined, glabrous or nearly so; principal segments 9–11, short-stalked, lanceolate, 2–5 cm. long, acute at the base, acuminate at the apex, glabrous above, paler and somewhat pruinose beneath; intermittent segments wanting; pseudo-stipular leaves lanceolate, oblique, 3–5 mm. long; inflorescence branched, 5–8 cm. long, glabrous; pedicels 1 cm. long or more, articulate at the middle; calyx glabrous, 5 mm. long, the lobes ovate, nearly as long as the tube; corolla white, fully 1 cm. long, the lobes lanceolate, about as long as the tube, puberulent on the margins; anthers 6 mm. long, cordate at the base, retuse at the apex; fruit unknown.

Type collected on stony hillsides near San Juan del Rio, Querétaro, August 18, 1905, *Rose, Painter & Rose 9586* (U. S. Nat. Herb. *no. 453076*).

14. **Solanum lanciforme** Rydberg nom. nov.

S. cardiophyllum subsp. *lanceolatum* Bitter, Repert. **11**: 440. 1912.

S. lanceolatum Berth.; Bitter, *loc. cit.*, as synonym. Not *S. lanceolatum* Cav. 1794.

I think that this very well deserves specific rank. The name originally proposed is preoccupied, however. It would not be advisable to adopt one of Bitter's varietal names *endoiodandrum* and *amphixanthandrum*, as these varieties and these names were based on the variable color of the anthers, a character of no value whatever. Both were described from individuals of *Pringle 8599*.

HIDALGO: *Rose & Painter 6627*.

PUEBLA: *Pringle 8599*.

15. **Solanum Ehrenbergii** (Bitter) Rydberg sp. nov.

Solanum cardiophyllum subsp. *Ehrenbergii* Bitter, Repert. **11**: 443. 1912.

This is closely related to the preceding but the leaves are densely short-pubescent, the inflorescence more branched and the pedicels longer. The type was collected in Mexico by Ehrenberg, but without any definite locality and without number.

The only specimen seen, which agrees with the original description, is the following.

SAN LUIS POTOSI: *C. C. Parry 10.*

16. **Solanum brachistotrichum** (Bitter) Rydberg sp. nov.

S. Jamesii brachistotrichum Bitter, Repert. **11**: 444. 1912.

Bitter made this merely a variety of *S. Jamesii*, evidently overlooking the fact that the leaf-segments are distinctly stalked, and the lateral ones decidedly oblique at the base. The general habit, leaf-form, and corolla, are practically the same as in *S. lanciforme*, but the calyx-lobes are lanceolate and fully as long as the tube, and the leaves are decidedly puberulent.

CHIHUAHUA: *Pringle 668; Wilkinson* (in 1885).

17. **Solanum nayaritense** (Bitter) Rydberg sp. nov.

S. Jamesii subsp. *nayaritense* Bitter, Repert. **12**: 8. 1913.

This is related to *S. Jamesii*, but distinguished from all related forms by the corolla which is crisp-hairy without, and the leaves hirsute on both sides. It is represented by the type collected by Diguet, in Sierra Nayarit and by the following specimen, which agrees fully with the original description.

TEPIC: *Rose 2134.*

18. SOLANUM JAMESII Torr. Ann. Lyc. N. Y. **2**: 227. 1827.

S. Jamesii heterotrichum Bitter, Repert. **11**: 444. 1912.
S. Jamesii subsp. *septentrionale* Bitter, Repert. **12**: 10. 1913.
S. Jamesii subsp. *septentrionale ripicolum* Bitter, Repert. **12**: 151. 1913.

The first variety, proposed by Bitter, represents one of the common forms of the typical *S. Jamesii* from Colorado. The subspecies *septentrionale* was proposed to cover all the varieties of *S. Jamesii* from the United States and Northern Mexico. It included the typical form, the two varieties mentioned above and the variety *brachistotrichum*, which last one evidently is distinct. The variety *ripicolum* I have not seen, but from the description I judge that it represents a form of *S. Jamesii*. *S. Jamesii* is mostly confined to the United States, *i. e.* Colorado, New Mexico, southeastern Utah, and Arizona, but is also found in Chihuahua and perhaps in Sonora.

19. **Solanum michoacanum** (Bitter) Rydberg sp. nov.

S. Jamesii subsp. *nayaritense michoacanum* Bitter, Repert. **12**: 9. 1913.

In my opinion, this is more closely related to *S. Jamesii* than to *S. nayaritense*, differing from the former in being decidedly more pubescent, in the sparingly hirsute calyx, and in the larger corolla about 12 mm. long. The question may be asked: Why not accept Bitter's views and include all these species in *S. Jamesii?* They are all closely related to it. If so, we must include also *S. pinnatisectum* Dunal and *S. stenophyllidium* Bitter, which are also closely related to it and not based on better characters. *S. michoacanum* is known only from the type collected at Pungauto, near Morelia, Michoacan, *Arsène 2896*.

20. S. PINNATISECTUM Dunal, in D.C. Prodr. 13[1]: 40. 1852.

This species is characterized by its narrower and more numerous leaflets, glabrous inflorescence and the articulation of the pedicels, which is higher up. Bitter* proposed two varieties, *pentazygum*, the typical form, and *heptazygum*, of very little value.

MICHOACAN: *Arsène 2895*.

QUERÉTARO: *Agniel 10380, 10467, 10580*.

21. SOLANUM STENOPHYLLIDIUM Bitter, Repert. **12**: 51. 1913.

This species is closely related to the preceding, but differs in the still narrower, and few, usually 5, leaf-segments. *Palmer 611* from Jalisco is the type.

22. **Solanum nicaraguense** Rydberg sp. nov.

A perennial, with stolons and probably tubers; stem 1–2 dm. high, sparingly hirsute or glabrate; leaves 7–12 cm. long, odd-pinnatifid; segments 3–7, subsessile, elliptic or lance-elliptic, glabrous or sparingly hirsute above, more pubescent beneath, the terminal one 3–5 cm. long, the lateral ones gradually smaller; intermittent segments rare and very small; pseudo-stipular leaves minute or wanting; inflorescence 2-forked; peduncle 2–5 cm. long; pedicels 1–1.5 cm. long, sparingly hirsute, the articulation far below the middle; calyx puberulent, 3–4 mm. long, the lobes triangular or ovate, acute, shorter than the tube;

* Repert. **12**: 49–50. 1913.

corolla about 8 mm. long, the lobes deltoid-lanceolate, longer than the tube, puberulent especially along the margins; fruit unknown.

Type collected in Nicaragua, 1868, *C. Flint* 8 (U. S. Nat. Herb. *no. 42676*).

23. SOLANUM POLYADENIUM Greenm. Proc. Am. Acad. **39:** 89. 1903.

This is a very distinct species, differing from the other species with star-shaped corolla in the glandular pubescence, the broader corolla lobes, and the oblong fruit.

HIDALGO: *Pringle 13136, 8692; Rose & Painter 7080.*

MICHOACAN: *Arsène 5232.*

3. BULBOCASTANA

Leaves pubescent, acute or obtuse; corolla 17–20 mm. broad..... 24. *S. bulbocastanum.*

Leaves glabrous, acuminate; corolla about 10 mm. broad..... 25. *S. morelliforme.*

24. SOLANUM BULBOCASTANUM Dunal, in Poir; Lam. Encycl. Suppl. **3:** 749. 1813.

Bitter* proposed two varieties: *dolicophyllum* and *latifrons*. The former cannot be separated from the type, the latter I have not seen.

VERACRUZ: *F. Mueller* (in 1855).

PUEBLA: *Arsène 10132.*

MEXICO (Federal District): *Pringle 9340; 9136; Rose & Hay 5513; Salazar.*

MORELOS: *Pringle 6397.*

25. SOLANUM MORELLIFORME Bitter & Muench, Repert. **12:** 154. *pl. 2.* 1913.

In both of the two instances this plant has been collected, it was found growing in hollow trees.

Chiapas: Muench (in 1912).

Puebla: Purpus 7399.

4. OXYCARPA

Principal leaf-segments 9–11; calyx-lobes lanceolate.

Calyx-lobes 3–4 mm. long, acuminate; corolla not glandular; leaf-segments elliptic-lanceolate, abruptly contracted at the base..... 26. *S. monoteranthum.*

* Repert. **11:** 447. 1912.

Calyx-lobes 2 mm. long, acute; corolla glandular without near the base; leaf-segments lanceolate, tapering at the base..... 27. *S. oxycarpum.*
Principal leaf-segments 7–9; calyx-lobes ovate, 1.5 mm. long, short-acuminate; leaf-segments abruptly contracted at the base..... 28. *S. longiconicum.*

26. SOLANUM MANOTERANTHUM Bitter, Repert. **11**: 383. 1912.

I have seen no specimens, but the description and its stated relationship to *S. columbianum*, makes it easy to place it systematically. It must be related to *S. oxycarpum*. The type was collected at Vulcan Barba Volu, Panama, *Rcesl.*

27. SOLANUM OXYCARPUM Scheede, in Schlecht. Hort. Hal. **1**: 5. *pl. 3*. 1841.

No specimens have been seen, but there is a good illustration in "Hortus Halensis."

28. SOLANUM LONGICONICUM Bitter, Repert. **10**: 534. 1911.

Bitter cited two collections from Costa Rica; to these may be added:

COSTA RICA: San Cristobal, *C. Wercklé.*

5. JUGLANDIFOLIA

29. SOLANUM JUGLANDIFOLIUM OERSTEDII Bitter, Repert. **11**: 461. 1912.

As I have not seen the specimens on which Bitter based this variety, I am not prepared to state if it is distinct from the *S. juglandifolium* of Columbia, or not.

6. SUAVEOLENTIA

Principal leaf-segments 5–7; foliage and inflorescence somewhat glandular..... 30. *S. Grossularia.*
Principal leaf-segments 9–11; foliage and inflorescence not glandular.
Leaves 1–2 dm. long; principal segments short-stalked, the intermittent ones small, sessile; inflorescence usually simple..... 31. *S. suaveolens.*
Leaves 2–3 dm. long; principal segments with stalks 5–30 mm. long, the intermittent ones often 1–2 cm. long, stalked; inflorescence 2-forked..... 32. *S. canense.*

30. SOLANUM GROSSULARIA Bitter, Repert. **10**: 537. 1911.

This species was described from cultivated specimens raised

from seed from Costa Rica or Nicaragua. No wild specimens have been seen by me.

31. SOLANUM SUAVEOLENS Kunth & Bouché, Ind. Sem. Hort. Berol. **1848:** 14. 1848.

This resembles *S. verrucosum* in habit, but the flowers are smaller, white and more deeply lobed and the articulation of the pedicels strictly basal. No tuber has been found. Bitter* proposed three varieties, *glabrescens*, *pluriphyllidium*, and *chalarophyes*, apparently on trifling characters. The following specimens belong to the species:

MEXICO: Zacuápan, *Purpus 6329.*

COSTA RICA: *Cock & Doyle 329: Tonduz 11495, Kuntze 2053.*

NICARAGUA: Volcan Mombacks, *Baker 34.*

32. **Solanum canense** Rydberg sp. nov.

A perennial, probably without tubers; stem herbaceous, 1–2 mm. long, spreading, pruinose, angled; leaves 1–3 dm. long, odd-pinnatifid; rachis barely wing-margined; principal leaf-segments 9–11, lanceolate, acuminate, minutely granular-puberulent on both sides, sometimes with a few scattered hairs on the veins, the terminal one 5–10 cm. long, the lateral ones stalked, the petiolules 1–3 cm. long, the blades 3–8 cm. long, oblique at the base; intermittent segments 5–20 mm. long, stalked; peduncles infra-axillary, sub-opposite the leaves, 1–1.5 dm. long (below the forking), 2-forked, the branches 5–10 cm. long; pedicels 1–1.5 cm. long, articulate at the base; calyx puberulent, the tube 1.5 mm. long, the lobes ovate, less than 1 mm. long; corolla white, star-shaped; fruit globose, about 1.5 cm. in diameter.

Type collected between April 17 and June 8, 1908 in the vicinity of Cana, Panama at an altitude of 2500 feet, *R. S. Williams 844* (herb. N. Y. Bot. Gard.).

7. APPENDICULATA

Style shorter than the stamens.	
Leaves and branches sparingly hairy; leaf-segments 3, rarely 5, thin	33. *S. appendiculata.*
Leaves and branches densely hairy; leaf-segments 7, rarely 5, firmer	34. *S. subvelutinum.*
Style much longer than the stamens; leaf-segments mostly 5, moderately pubescent	35. *S. inscendens.*

*Repert. **11:** 352–354. 1912.

30. SOLANUM APPENDICULATUM Humb. & Bonpl.; Dunal Solan. Syst. 5. 1816.

There are at least three species in Mexico, which have been taken for *S. appendiculatum*. Of the three known to me, there is only one which agrees with the original description and that in De Candolle's Prodomus. The other two do not agree in the following particulars: "foliis . . . 1–2 jugis, segmentis oblongis acuminatis, utrinque acutis, supra adpresse pilosiusculis, subtus in venis pubescentibus; . . . Stylus staminibus subaequalis;" for the second has 7 leaflets, densely pubescent, and in the third the style is twice as long as the stamens. The first one which I regard as the true *S. appendiculatum*, is well represented by *Pringle 4922* from Oaxaca. The type came from Hidalgo.

34. **Solanum subvelutinum** Rydberg sp. nov.

A perennial woody vine; stem brown, in age glabrate, rooting at the nodes; branches densely short-pilose, subvelutinous when young; leaves 5–10 cm. long, odd-pinnatifid; petioles 1–2 cm. long, as well as the rachis subvelutinous; leaf-segments 5–7, elliptic or oblanceolate, acute at both ends, or short-acuminate at the apex, pilose on both sides, densely so beneath, short-stalked, the terminal one 2–4 cm. long, the lateral ones successively smaller; inflorescence at the ends of the leafy branches, 2-forked and again branched; common peduncle 1–2 cm. long, as well as its branches subvelutinous; pedicels glabrous, about 1 cm. long, articulate at the base, gradually thickened upwards; calyx sparingly pilose, the tube 1 mm. long, the lobes triangular-ovate, 1.5 mm. long, corolla white, 4 mm. high and 6–7 mm. broad, star-shaped, the lobes ovate; anthers oblong, 3 mm. long, cordate at each end; style shorter than the stamens; stigma capitate; fruit unknown.

Type collected at San Ramón, Durango, in April or May, 1906, *Edward Palmer 183* (U. S. Nat. Herb. *nc. 571203*).

35. **Solanum inscendens** Rydberg sp. nov.

A perennial woody vine; stem brown in age, glabrate, rooting at the nodes; branches rather densely and finely pilose when young; leaves 5–8 cm. long; petioles 1–3 cm. long, finely pilose; rachis not winged; leaflets 3–7, sparingly hispidulous above puberulent and on the veins somewhat pilose beneath; terminal leaf-segments rhombic-ovate, or rhombic-lanceolate, 2–4 cm. long, cuneate at the base, acuminate at the apex; upper lateral segments ovate or lanceolate, 1.5–3 cm. long, short-stalked,

the lower pair if present much smaller; inflorescence at the ends of the leafy branches, 6–10-flowered, 2-forked and again branched; common peduncle 1–2 cm. long, finely pilose; pedicels glabrous, about 1 cm. long, articulate at the base; calyx sparingly pilose, the tube scarcely 1 mm. long, the lobes broadly ovate, 1.5 mm. long; corolla about 5 mm. high and broad, star-shaped, the lobes broadly ovate; anthers broadly oblong; 2–2.5 mm. long, cordate at each end; style 6 mm. long, more than twice as long as the stamens, in age curved; stigma capitate; fruit globose, 15 mm. in diameter when fully developed.

Type collected on Ixtaccihuatl, January, 1906, at an altitude of 8000 ft., *C. A. Purpus 1733* (herb. N. Y. Bot. Gard.).

Apparently the same species in fruit was collected near Cataract, Orizaba, Vera Cruz, in 1883, *A. Gray*.

There are a few species reported from Mexico or Central America, of which I have seen no specimens and which I cannot place in my key.

SOLANUM MURICATUM PARVIFOLIUM H. B. K. Nov. Gen. & Sp. **3**: 21. 1818.

The type of *S. muricatum* came from Peru, and no specimen of the subsection Basarthrum with simple leaves has been seen from Mexico. The name *parvifolium* cannot be used as specific name, however, as it has already been used as such. It is a possibility that this variety is the same as *S. morelliforme* Bitter.

SOLANUM SCHENCKII Bitter, Repert. **11**: 448. 1912.

SOLANUM SCHIZOSTIGMA Bitter, Repert. **11**: 449. 1912.

Both these species are related to *S. tuberosum*. The types are both in the Berlin herbarium. No specimens answering the descriptions have been seen by me.

NEW YORK BOTANICAL GARDEN.

Contributions to the Flora of Long Island, N. Y.
Second Paper

William C. Ferguson

Introductory

The writer became interested in Botany in 1917. At the end of the season of 1918 he had collected 753 herbarium sheets comprising 370 species. At the end of 1923, 8800 herbarium sheets comprising 1345 species of Long Island plants, all found and collected by himself, with the exception of 15 to 20 sheets. 1080 native species and 264 introduced.

At the close of the season of 1921 the writer published a list of the plants he had found that seemed of most interest entitled: Some Interesting Plants from Long Island, by William C. Ferguson. Torreya **22**: 43–49. May–June, 1922.

The present paper (the 2d) gives a list of the more interesting plants the writer has found on Long Island since the first publication, but includes also some of earlier date, goes more into details as to locality, in some cases describes plants more elaborately and offers some opinions, but with the diffidence that comes through a realization of but few years' field experience.

The writer gratefully and with pleasure acknowledges the kind assistance of other workers who have kindly reviewed his plants.

Mrs. Agnes Chase—All grasses.

Dr. N. L. Britton—All sedges except Carex.

Mr. K. K. Mackenzie—Carex.

Professor M. L. Fernald, Dr. Witmer Stone, Dr. P. A. Rydberg, Dr. J. K. Small, Mr. Bayard Long, Mr. Eugene P. Bicknell, Mr. Paul C. Standley, Mr. F. V. Coville. Dr. Ezra Brainerd, Dr. H. M. Denslow, Dr. Edward S. Burgess, Dr. F. W. Pennell, Mr. Percy Wilson, Mr. Norman Taylor, and others have kindly reviewed plants when there was doubt about identity. Such progress as the writer has made is largely due to kind assistance from the above experienced botanists.

The views of many authorities both from the literature and from letters to the author are freely quoted. The names of the

plants are based mainly upon Britton & Brown's "Illustrated Flora" with the exception of the grasses which are in accordance with Hitchcock & Chase and in a number of cases the interpretation of Professor M. L. Fernald is given prominence.

EQUISETACEAE. Horsetail Family

Equisetum fluviatile L. — Open swamp. Woodside.
" " Sag Harbor.

TAXACEAE. Yew Family

Taxus canadensis Marsh. — Woods, 3 to 4 miles northwest of Deer Park.

Plant 12 to 15 ft. × 12 ft. associated with *Lycopodium complanatum* var. *flabelliforme*. The writer can find no other record of a wild plant on Long Island. Mr. Henry Hicks knows of but three, all introduced, on estates.

Mr. R. W. DeForest—Cold Spring Harbor, Plant 19 years old
Mr. Paul Dana—Glen Cove, Plant 50 years old 20 ft. × 20 ft.
Parsons' Estate—Flushing, Plant 50 years old 20 ft. × 20 ft.

This wild plant is older than that at Cold Spring Harbor, and is either a native survival from colder times or may be due to birds carrying the seeds from the Long Island cultivated plants or from wild plants further north.

NOTE—Britton & Brown's Illustrated Flora describes the leaves as "dark green on both sides;" Gray's Manual as "green on both sides;" F. Schuyler Mathews' Field Book of American Trees and Shrubs describes the leaves "of warm bright-yellow green beneath, very dark green above." This last description is the only good one.

ZANNICHELLIACEAE. Pondweed Family

Potamogeton confervoides Reicht
Name conferred by Norman Taylor. — Pine barrens, Sandy Pond, Manorville.

ALISMACEAE. Water Plantain Family

Sagittaria teres S. Wats. — Growing in water, Kent Pond, Manorville.
Pond northeast of Kent Pond, Manorville.

Deep Pond and Long Pond, Wading River.
All four stations in the pine barrens.

The beak of mature achenes is horizontal or somewhat inclined, not vertical as described and figured in Gray's Manual, Britton & Brown's "Illustrated Flora" and J. G. Smith's "North American Species of Sagittaria and Lophotocarpus." The writer's determinations were kindly corroborated by Mr. Bayard Long who describes them as typical but observes that the beak is more or less oblique. Professor M. L. Fernald has also examined them and pronounces them typical; as the same as twenty-four collections from Massachusetts, all with horizontal beaks.

Sagittaria Engelmanniana J. G. Smith — Pine barrens, shores of ponds and swamps.
Ronkonkoma.
Central Islip.
Wading River.
Manorville, 4 stations.
Leaves varying from phyllodia to linear, to sagittate with narrowly linear to ovate parts. Extremely variable. The writer's identification has been kindly verified by Dr. Witmer Stone, Mr. Bayard Long, and Mr. E. P. Bicknell.

This species has been so puzzling to the writer that it seems worth while to review his experience. Britton & Brown's "Illustrated Flora," Gray's Manual, J. G. Smith's "North American Species of Sagittaria and Lophotocarpus 1894" all separate *Sagittaria Engelmanniana* J. G. Smith from *Sagittaria longirostra* (Micheli), J. G. Smith principally by leaf form, describing and figuring the former with sagittate leaves with linear parts, and the latter with sagittate leaves with ovate parts, although Smith in his monograph in general introductory remarks calls attention to the unreliability of leaf form as a means of separating species unless co-related with other more important

characters. So late a publication as "Flora of the District of Columbia", Contributions from the National Herbarium at Washington, 1919, separates the above two species (?) by leaf form. As to localities, in a general way all of the above authorities place *S. Engelmanniana* north of New Jersey and *S. longirostra*, New Jersey and south, with but few exceptions.

In Torreya, February, 1909, Mr. K. K. Mackenzie as a result of field observation states that as described in the manuals *S. Engelmanniana* and *S. longirostra* are but different forms of the same species, the leaf form having no diagnostic value.

In Flora of Nantucket, Bulletin of the Torrey Botanical Club, Mr. E. P. Bicknell describes the Nantucket plant as *Sagittaria Engelmanniana* J. G. Smith with lamina of blades varying from linear to ovate, from 1 mm. to 4 cm. wide.

In Plants of Southern New Jersey, Dr. Witmer Stone describes as the common arrowhead of the Pine Barrens *Sagittaria longirostra* (Micheli) J. G. Smith with a very variable leaf form narrowly linear to broadly hastate and states that the narrow leaved form of the Pine Barren plants was long confused with *S. Engelmanniana*, a more northern species.

At a time when the writer was much perplexed over this subject he found in a Pine Barren swamp at Ronkonkoma two colonies of *Sagittaria* one-quarter of a mile apart, one colony growing in the open with linear sagittate leaves and one colony in shady thickets with ovate sagittate leaves. They were undoubtedly the same species, but which; *Engelmanniana* or *longirostra*? Specimens of both forms were sent to Dr. Witmer Stone who identified them as the same as the New Jersey Pine Barren plant described as *S. longirostra* (Micheli) J. G. Smith in Plants of Southern New Jersey. Dr. Stone wrote that the researches of Mr. Bayard Long had caused them to now name this plant *S. Engelmanniana* J. G. Smith.

Specimens from the same colonies were also sent to Mr. Eugene P. Bicknell, who identified them as the same as his Nantucket plants, *S. Engelmanniana*. Mr. Bicknell wrote as follows: "I should call these plants *S. Engelmanniana* believing at the same time that this name will be a synonym of *S. longirostra* with variations named as forms if one wants to do hair-splitting. The winging of the fruit varies with the width of the leaves. In a swamp now filled in at Lynbrook was a plant 7.5

dm. tall with leaf blades 3 dm. long. Such plants further south would undoubtedly pass as *S. longirostra.*"

The writer has not yet found this type of arrowhead outside of the Pine Barrens and it is suggestive to realize that the robust plant referred to above by Mr. Bicknell undoubtedly grew in much richer soil.

Is there a *Sagittaria* with long oblique beak that is specifically distinct from that described above as *Sagittaria Engelmanniana* J. G. Smith or is the more robust plant due to the more favorable conditions that one would expect outside of the Pine Barrens? It is to be hoped that Mr. Bayard Long will soon publish the result of his study of this subject.

Sagittaria latifolia Willd.

Although widely distributed throughout Long Island the writer has not found this Arrowhead in the Pine Barrens. Writing of this experience to Mr. Bayard Long, Mr. Long replied that neither he nor his associates had ever found it in the Pine Barrens of New Jersey.

GRAMINEAE. Grass Family

Danthonia compressa Austin. Hempstead Reservoir, edge of oak woods.
Roslyn, edge of rich woods.
Montauk, edge of rich woods.

Eragrostis capillaris (L) Nees Northwest of Plattsdale, edge of woods.
Smithtown, edge of woods.
Roslyn, edge of woods.

Festuca nutans Willd. Hempstead Reservoir, thicket, one small colony.

Festuca gigantea (L) Mill. Lloyd's Neck, north of Huntington roadside. Native of Europe. Letter from National Herbarium, Washington, states, "The only records from America Ottawa, Canada and Dobbs Ferry, N. Y. 1881."

Hordeum jubatum L. Montauk near village. One clump.
Yaphank, Camp Upton. One clump.

Panicularia septentrionalis (Hitch) (Bicknell)	Montauk Point. Swampy woods.
Panicularia acuti:flora (Torr.) Kuntze	Swamps, Montauk. Hempstead Reservoir. Queens. Three Mile Harbor.
Panicularia laxa Scrib.	Freeport. Swampy woods. Rockville Centre. Swampy woods.
Sporobolis uniflorus Muhl.	Pine Barrens widely distributed wherever it is wet. The writer has not seen it outside the Pine Barrens.
Sporobolis compressus (Torr.) Kunth. (*S. Torreyana* (Schulte.) Nash)	Both the Illustrated Flora and Gray's Manual state that this species is found in the Long Island Pine Barren Bogs. Taylor's Flora of the Vicinity of New York states, "No records or specimens from Long Island available. The writer has looked for but never seen this plant."
Sporobolis asper (Michx.) Kunth.	Cold Spring Harbor, Sandy roadside and sea beach. Merrick. Dry sandy bank.
Panicum spretum Schult.	Riverhead. Swamp. Single station Montauk. Borders swamps and ponds. Several stations.
Panicum microcarpon Muhl.	Flushing. Swamp northeast of Bowne Pond. Pubescent throughout. The only specimen like this known to the National Herbarium is from Arkansas.
Panicum Ashei Pearson?	Hempstead Reservoir. Dry oak woods. Intermediate between *P. Ashei* and *P. dichotum* or *barbulatum*. Much narrower blades than typical *P. Ashei*.
Panicum Ashei Pearson?	Rockville Centre. Dry oak woods. Intermediate between *P. Ashei* and a more pubescent plant. Leaves pubescent beneath.

The two last strongly suggest *hybrids*.

CYPERACEAE. Sedge Family

Cyperus erythrorhizus Muhl. Coram. Swampy meadow Edwards Pond. Mr. E. S. Miller found this plant and locality many years ago.

Cyperus ferax L. C. Richard Flushing. Bog.
East Hampton. Salt marsh.
Long Beach. Salt marsh.
Millneck. Edge of pond. Edge of woods.

NOTE—*Cyperus speciosus* Vahl. *Cyperus Engelmannii* St. as described and figured in The Illustrated Flora. The writer has not yet found these plants.

ELEOCHARIS

Eleocharis capitata (L.) R. Br. (*E. tenuis* (Willd.) Schultes) Montauk. Edge of swampy woods. Much taller and correspondingly stouter than the type with upper scales of spike acute as in *Eleocharis acuminata* (Muhl.) Nees, but lacking the flat culms of the latter.

Eleocharis Robbinsii Oakes Manorville. Pond northeast of Kent Pond. Long Pond. Pine barrens.
Wading River. Pine barrens.

ERIOPHORUM

Eriophorum tenellum Nutt. Meadowbrook.
Montauk. Open swamps.
Central Islip. Open Pine Barrens Swamps.
Ronkonkoma. Open Pine Barrens Swamps.
Manorville. Open Pine Barrens Swamps.

SCIRPUS

Scirpus novae-anglae Britton North of Queens. Water hole. Motor Parkway.
One colony.

Scirpus heterochaetus Chase	Montauk. Small pond. One colony.
Scirpus polyphyllus Vahl.	Setauket. Swamps. Wading River. Swamps.
Scirpus Torreyi Olney	Manorville. Pine barrens. Bog near Kent Pond.
Scirpus Olneyi Gray	Riverhead. Salt marsh. Douglaston. " " Mr. E. N. E. Klein knew of last-named locality.
Scirpus subterminalis Torr.	Yaphank. Ronkonkoma. Flanders. Last two localities, pine barrens.
Scirpus lineatus Michx.	Montauk. Road near village. Colony of a half-dozen plants. Swamps both sides of road. Located by Mr. Roland Speed of Sea Cliff.

HEMICARPHA

Hemicarpha micrantha (Vahl) Pax.	Lake Ronkonkoma. Sandy shore

RYNCHOSPORA

Rynchospora pallida M. A. Curtis	Central Islip. Pine Barren swamp. July 24, 1920–21. Small colony. Drier ground and maturing earlier than *R. alba* in same swamp. Probably never found before north of Pine Barrens of Southern New Jersey. It is interesting to record here that in a Pine Barren Swamp at Ronkonkoma, four miles distant from the Central Islip Swamp the writer discovered *Lycopodium carolinianum*, a plant never before reported north of the New Jersey Pine Barrens.

Rynchospora fusca (L.) Ait.	Manorville. Wet sandy shores of Kent Pond and pond northeast of Kent Pond. Ronkonkoma swamp. All in Pine Barrens.
Rynchospora macrostachya Torr.	Smithtown. Wet shore of Miller's Pond. Middle Island, wet shore Artists' Lake. Long Pond, wet shore. Wading River swamp. Manorville. Sandy pond. Two last localities in pine barrens.
Rynchospora inundata (Oakes) Fernald	Manorville. Grows in some depth of water Kent Pond and pond northeast of Kent Pond. Pine barrens. Mr. E. S. Miller guided writer to first locality.

These plants have been determined by Professor M. L. Fernald. For a review of this group see Rhodora, Aug. 1918, "Allies of Rynchospora macrostachya." M. L. Fernald.

Rynchospora corniculata (Lam.) Gray

The above plants were also determined by Dr. N. L. Britton as *R. corniculata* and so reported in my first paper, Torreya **22**: 43–49. Dr. Britton includes all forms of the large beaked *Rynchospora* under one species. See Britton & Brown's Illustrated Flora.

Scleria reticularis Michx.	Long Pond, Wading River. Pine barrens wet sand shore.
Scleria Torreyana Walp.	Central Islip. Grassy, sandy swamp.

The name of *Torreyana* Walp. is in accordance with the opinion of Dr. N. L. Britton who, with the writer, has studied these Long Island plants at the New York Botanical Garden and compared them with the type *Scleria setacea* from Porto Rico. The Porto Rico plants have the achene very deeply reticulated and with sharp edges. The lobes of the hypogynium are rounded. Some characteristics of the above two Long Island plants are given herewith:

	S. Torreyana Walp	*S. reticularis* Michx.
Height of plant	4½ to 5½ dm.	2½ to 3 dm.
General aspect	Slender or more drooping	Stouter, erect
Lower leaf sheaths	Glabrous	Pubescent
Roots when fresh	Fibrous, pinkish-red	Fibrous, pinkish-red
Hypogynium lobes	Acute or acuminate	Blunt, or emarginate
Achene	Pubescent. Irregularly roughened. Broader than long. 1¾ to 2 mm. broad. 1½ mm. high. Smooth and rather flat on top. Immature achenes perfectly smooth and glabrous	Glabrous. Regularly reticulated. Reticulations shallow with rounded edges. Achenes as broad as long—1½ mm. broad, 1½ mm high. Reticulation right up to the prominently apiculate top.

Dr. N. L. Britton is of the opinion, in which the author concurs, that this group should be revised and has urged the writer to undertake it. The latter feels it should be done by one with far more experience.

Certainly the above two Long Island plants are separate species.

CAREX

Carex cristatella Britton	Woodside. Swampy woods. Abundant. Only locality found.
" *trisperma* Dewey	Coast cedar swamp between Good Ground and Flanders.
" *virescens* Muhl.	Rich woods. Wading River. Douglaston. Northwest of Huntington.
" *festucacea* Schk.	Rich woods. Richmond Hill. Northwest of Huntington.
" *anceps* Wahl.	Rich woods. Plattsdale. Roslyn. Bayside.
" *prasina* Wahl.	Bayside. Open bog.
" *umbellata* Schk.	Lakeview. Open dry sand, but few plants associated with *C. tonsa*.
" *hystricina* Muhl.	Woodside. Swamp. In shade in tall grass.
" *typhina* Michx.	Swampy woods. Queens, Hollis, Bayside, Flushing.
" *squarrosa* L.	Swampy woods. Douglaston.

" *hirsutella* Mackenzie — Rich woods. Wyandanch.
" *brachyglossa* Mackenzie — Montauk. Sandy bank shore of Great Pond.
" *laxiculmis* Schwein — Rich woods. Wyandanch. Bayside. Plattsdale.
" *umbellata* × *tonsa* — Hempstead Reservoir. Dry open sand.
" *varia* × *tonsa* — Hempstead Reservoir. Dry open sand.
" *Swanii* × *gracillima* — Plattsdale. Rich woods.

ARACEAE. Arum Family

Orontium aquaticum L. — Pond in Queens woods. Coast cedar swamp southeast of Flanders.
Bog, Roosevelt.

XYRIDACEAE. Yellow-eyed Grass Family

Xyris Congdoni Small. — Pine barrens Manorville, two stations Sandy Pond.
Pond northeast of Kent Pond. Growing in water.

JUNCACEAE. Rush Family

Juncus militaris Bigel. — In water. Most pine barren ponds of Manorville. Wading River. Middle Island.
" *Torreyi* Coville — Calverton. Swamp. Small colony ½ dozen plants.
" *articulatus* L. — Pine barren swamp south of Flanders.
Wet salt shore pond, Seaford.
" *Greenii* Oakes & Tuckm. — Wading River. Dry woods.

Plants extremely slender, prostrate, inflorescence attenuate. Superficially bearing no likeness to typical *J. Greenii*. This plant was sent to Professor K. M. Wiegand who suggested it was a shade form of *J. Greenii* and advised sending it to F. V. Coville who examined it and had never seen anything so attenuate, advising careful field study to find intermediates between

this and form of open plains. He stated it might be a shade form of *J. Greenii*, a hybrid of *J. Greenii* or a new species. Mr. E. P. Bicknell has determined it as a shade form of *J. Greenii* similar to plants he found at Nantucket. (See Bull. Torrey Botanical Club, Jan. 1909). Mr. Bicknell writes "as nearly as I can remember there were intermediate forms between the hard open soil and the loose soil of shady pine woods."

LILIACEAE. Lily Family

Lilium canadense L. — Montauk. Open swamps. Rare.

" *philadelphicum* L. — Montauk. Open rolling downs. Locally frequent.

CONVALLARIACEAE. Lily-of-the-Valley Family

Uvularia nitida (Britton) Mackenzie — Manorville. Pine barrens. Thicket near swamp, Jones Pond. Single colony of 3 plants found by Mr. E. S. Miller when with the writer. Determination confirmed by K. K. Mackenzie.

TRILLIACEAE. Wake Robin Family

Trillium erectum L. — Millneck. Wet woods. Abundant.

" *cernuum* L. — Cold Spring Harbor. Wet woods. Single plant, Bayside. The Alley. Rich hilly woods. Small colony.

ORCHIDACEAE. Orchid Family

Blephariglottis psycodes (L.) Rydbg. — Montauk. Reed Pond. Rich woods. Single plant.

Isotria affinis (Austin) Rydbg. — Woods. Half Hollow Hills. Wyandanch. Two plants; one single and one double-flowered, ½ mile apart. Thorough search at each station revealed no others. Have never seen *Isotria verticillata* in these woods. Name verified by Dr. H. M. Denslow. Both in fruit. Found middle of October.

Malaxis unifolia Michx. — Montauk Point. Open swampy meadow. Two plants.
Rich woods north of Wyandanch. One plant.
Rich woods northeast of Wyandanch. One plant.

BETULACEAE. Birch Family

Betula lutea Michx. f. — Cold Spring Harbor. Several trees both sides of ponds.

Betula papyrifera Marsh — Wading River. Coram. Shown these trees by Mr. E. S. Miller.
Millneck. Rich woods. Single tree.

ULMACEAE. Elm Family

Ulmus americanus L. — Growing as dominant tree in extensive woods at Trains Meadows south of North Beach and north of Woodside. Associated with *Quercus bicolor* and *Acer rubrum*, both abundant and *Fraxinus pennsylvanica* occasional.
Very wet woods. Unquestionably native. The writer has also observed it in woods at Kissena Flushing and scattered through Long Island, in such cases difficult to decide whether native or introduced.

ARISTOLOCHIACEAE. Birthwort Family

Asarum reflexum Bicknell — Rich woods northeast of Woodside.
Southeast of North Beach. Single station to which the writer was taken by Mr. Edward N. E. Klein of College Point who had collected it years ago.

POLYGONACEAE. Buckwheat Family

Persicaria pennsylvanica var. *laevigata* Det. by M. L. Fernald Det. by Bayard Long.	Small colony. Pine barren bog. Sandy pond. Manorville.
Persicaria Careyi (Olney) Greene	Wet shore, Edwards Pond, Coram.
	Wet shore, Long Pond, Wading River.
	Swamp southeast of Deep Pond, Wading River.
	All in pine barrens.
" *coccinea* (Muhl.) Greene	Aquatic form, pond Cypress Hills.
	Aquatic form, Bowne Pond, Flushing.
	Terrestrial form in swamps and wet pond borders, Woodside, Queens, Plattsdale, Bowne Pond, Flushing. Edwards Pond, Coram—the last in pine barrens.

This name is from a revision of the group in Flora of the Rocky Mountains and Adjacent Plains by Dr. P. A. Rydberg who kindly determined the Long Island plants.

The aquatic form was reported in my former paper Torreya **22:** 43–49 as *P. amphibia* (L.) S. F. Gray. The terrestrial form as *P. muhlenbergii* (S. Wats.) Small; both following description in Britton and Brown's "Illustrated Flora."

Rumex persicarioides L. This plant was so reported in my former paper Torreya **22:** 43–49 following treatment in Britton and Brown's "Illustrated Flora." Salt wet shores at Great pond and Oyster pond. Montauk. Shore of bay at Point of Woods.

The plants were sent to Professor M. L. Fernald who named them *Rumex maritimus* var. *fueginus* (Phil.) Dusen. See Rhodora, April 1915. *Rumex persicarioides* and its allies. H. St. John.

Rumex britannica L.	Swamps, Flushing, Kissena and swamp northeast of Bowne Pond.

Oyster Pond, Montauk.
Smithtown.
Pine barrens Central Islip.

Pleuropteris sachalinense Schmidt — Old Field. Sound Avenue, Native of Asia.

Pleuropteris Zuccarini Small — Extensively established at Laurel Hill and Woodside in waste ground. Native of Japan.

AMARANTHACEAE. Amaranth Family

Amaranthus pumilus Raf. — Sea beach, Point of Woods.

CHENOPODIACEAE. Goosefoot Family

Chenopodium hybridum L. — Smithtown, Woods.

Bassia hirsuta (Linn.) — Salt beaches, Long Beach. Point of Woods.
Salt marsh, Massapequa.

This plant impresses one as being native.

Dondia maritima (L) Druce. — Marshy salt beach, Cold Spring Harbor, 10/2/23.
Gravelly beach, Lloyd's Neck, 10/2/23.
Gravelly beach, Oyster Bay, 10/20/23.
Gravelly beach, Kings Park, 10/13/23.

" *linearis* (Ell) Heller — Sea beach, Kings Park, 10/13/23
Beach, Eaton's Neck, 10/13/23
Beach, Oyster Bay, 10/20/23
Beach, Northport, 10/13/23
Salt marsh, Millneck, 10/3/23
Salt marsh, Merrick, 10/17/23
Salt marsh, Massapequa, 10/16/23.

The naming of both species was verified by Mr. Paul C. Standley.

The two species aside from the radical difference in size of seed can be distinguished when mature at a glance. *D. maritima* mostly with red stem and dark green leaves as long on the branches as on the main stem, and *D. linearis* with stem mostly yellowish; but most striking are the very short leaves of the

branches. The writer has observed two types of *D. linearis*, that on sea beaches being slenderer in all its parts with smaller leaves and bright green; that of muddy, salt marshes, heavier, stouter, fleshier and pinkish. The seeds of both types are identical.

Most herbarium specimens of both species are immature and in this state often difficult to determine.

D. maritima matures later than *D. linearis*. The plant from Cold Spring Harbor, October 2, had ripe seed but that seems exceptional as even as late as October 20 the seed in a large majority of the plants had not matured. *D. maritima* grows in wetter situations than *D. linearis* and is almost completely submerged at high tide.

D. linearis matures probably late in September; all of the plants the writer collected in October had ripe seed. It grows in drier situations, farther back on the beaches nearly, if not quite out of reach of high tide. Or on the salt marsh—where it is just wet or damp.

These remarks are based on comparatively few observations during one season and further experience may change or modify them.

PORTULACACEAE. Purslane Family

Claytonia virginica L.
Millneck. Swampy woods. One small colony, 4/29/20.
Northwest of Plattsdale. Rich woods. Two small colonies, 4/22/21.
Wet woods, south of North Beach and north of Woodside, extensive colonies, 5/10/23.

RANUNCULACEAE. Crowfoot Family

Anemone virginiana L.
Montauk. Rich woods.

Batrachium trichophyllum (Chaix) F. Schultz
Valley Stream. Running water.

Caltha flabellifolia Pursh.
Central Islip. Pine barren stream. Determined by P. A. Rydberg.

CRUCIFERAE. Mustard Family

Cardamine parviflora L. Wading River. Pine barrens. Wet sandy shore of Deep Pond. One small colony.

Dentaria laciniata Muhl. South of North Beach. Rich woods. One colony.

SARRACENIACEAE. Pitcher Plant Family

Sarracenia purpurea L. Coast cedar swamp between Flanders and Good Ground. Sphagnum barren with small bushes, Calverton.

SAXIFRAGACEAE. Saxifrage Family.

Heuchera americana L. Richmond Hill. Rich hilly woods. One small colony.

FABACEAE. Pea Family

Lespedeza capitata Michx. × *Lespedeza angustifolia* (Pursh.) Ell.
" *Bicknellii* House)

Hempstead Plains, between Garden City and Mineola. These hybrids show every possible variation between the parents with which they are closely associated in growth. Mr. E. P. Bicknell has kindly verified the naming and wrote that he had collected them years ago.

Lathyrus palustris L. var. *pilosus* (Cham) Led Easthampton. Salt marsh.

Reported in my first paper as *L. palustris* L. Torreya **22**: 43–49.

See Rhodora, March 1911. Variations of *Lathyrus palustris*. M. L. Fernald.

OXALIDACEAE. Wood Sorrel Family

Ionoxalis violacea (L.) Small Richmond Hill. Rich hilly woods. One colony.

ILICACEAE. Holly Family

Nemopanthes mucronata (L.) Merrick. Coast cedar swamp. Trelease.

ACERACEAE. Maple Family

Acer platanoides L. — Northwest of Plattsdale. Rich woods. Two trees far apart and far from roads; one 9 inches in diameter and one somewhat smaller. Native of Europe.

" *Saccharum* Marsh — Northwest of Plattsdale. Rich swampy woods quite in center of woods away from roads. Colony of maybe 50 trees including many saplings. Largest tree 11 inches in diameter—next largest 9 inches. The interesting question and one difficult to determine is whether they are native or introduced.

HYPERICACEAE. St. Johnswort Family

Hypericum virgatum Lam. var. *ovalifolium* Britton — Manorville. Pine barrens. Meadow bordering small pond. Small colony. In flower 7/22/23. Flowers withered 8/7/22. Writer can find no previous record for Long Island. Determination verified by N. L. Britton.

CISTACEAE. Rock Rose Family

Lechia Leggettii Britt. & Hall — South Hempstead. Oak woods. Merrick. Dry grassy hollow.

" *tenuifolia* Michx. — Wading River. Pine woods at Long Pond.
North of Pinelawn, edge of woods.
Northwest of Central Islip. Dry woods.
All three localities in pine barrens.

ONAGRACEAE. Evening Primrose Family

Ludwigia sphaerocarpa Ell. — Boggy shores and in stream at Kent Pond and northeast of Kent Pond, Manorville. Pine barrens.

KNEIFFIA

These plants are named from "A Brief Conspectus of The Species of Kneiffia with the Characterization of a New Allied Genus." By Francis W. Pennell. Bull. Torrey Bot. Club. Oct. 17, 1919.

Kneiffia tetragona (Roth) Pennell — Woodside. Wet meadow and thicket. The only colony the writer has so far seen.

This is the *K. fruticosa* (L) Raimarin of The Illustrated Flora.

Kneiffia fruticosa (L.) Raimarin — Very variable, common and widely distributed.

This plant is *K. linearis* (Michx.) Spach and *K. longipedicellata* Small. of The Illustrated Flora.

HALORAGIDACEAE. Water Milfoil Family

Myriophyllum tenellum Bigel. — Montauk. Small pond. One station.

ARALIACEAE. Ginseng Family

Aralia hispida Vent. — Point of Woods. Swamp near bay.
East of Amagansett on Montauk road between pine barrens and sand dunes.
Cypress Hills. Rich swampy woods.

" *spinosa* L. — Valley Stream. Swampy woods. Probably introduced.

AMMIACEAE. Carrot Family

Cicuta bulbifera L. — Calverton. Wet border stream.

OLEACEAE. Olive Family

Fraxinus pennsylvanica Marsh. — South of North Beach. Swampy woods.
Greenport. Swampy woods.

GENTIANACEAE. Gentian Family

Dasystephana saponaria (L.) Small
- Meadowbrook. Open swamp and thicket.
- Meadowbrook stream ½ mile south of Meadowbrook swamp.
- Hempstead. Damp meadow and thickets northeast of village near water tower.
- Massapequa. Damp meadows near salt meadows.

Gentiana clausa Raf.
- Millneck. Thicket between rich woods and swamp. Small colony.

Both plants have been verified by Mr. E. P. Bicknell and by Professor M. L. Fernald. The Millneck plant was reported in my former paper, Torreya **22**: 43–49 as *Dasystephana Andrewsii*, following The Illustrated Flora.

For a review of this group by M. L. Fernald see Rhodora, August 1917.

Gentiana crinita Froel
- Northwest of Deer Park, not Brentwood as reported, Torreya **22**: 43–49.
- Woods north of Kew Gardens. In Richmond Hill woods, a continuation of Kew Garden woods, 50 years ago, I found a single plant.

ASCLEPIADACEAE. Milkweed Family

Asclepias quadrifolia Jacq.
- Rich woods. Richmond Hill, 6/15/20.

LABIATAE. Mint Family

Stachys palustris L.
- Montauk Point. Damp edge of pond. Small colony.

SCROPHULARIACEAE. Figwort Family

Agalinis holmiana (Greene) Pennell.
- Ronkonkoma.
- Setauket.
- Manorville.

All in dry pine barrens. Not common but widely distributed through the pine barrens and dry oak woods adjoining.

Mimulus moschatus Dougl. Woods. Millneck. Swampy border stream. ½ dozen plants. There is some doubt whether this is a native of Long Island or introduced. Determination verified by F. W. Pennell.

LENTIBULARIACEAE. Bladderwort Family

Utricularia pumila Walt. Pine barren bogs. Ronkonkoma, Yaphank, Central Islip, Long Pond, Wading River Bog (not pine barrens), Speonk.

" *fibrosa* Walt. Ronkonkoma.
Jones Pond, Manorville.
Central Islip.
All in pine barrens.

" *intermedia* Hayne Manorville between Jones & Sandy Ponds.
Jones Pond, in water.
Pine barrens.

" *radiata* Small Wading River, Long Pond.
Coram, Edwards Pond.
Both in pine barrens.
Rockville Centre, waterworks pond.

" *Gibba L.* Deep Pond, Wading River. Pine Barrens. Small colony in shallow water.

Dr. J. H. Barnhart has kindly verified the determinations of *Utricularia*.

Vesicularia purpurea (Walt) Raf. Kent Pond, Manorville.
Long Pond, Wading River.
Ronkonkoma swamp.
Pond, Wyandanch.
All in pine barrens.
Miller's Pond, Smithtown.
Pond at Babylon.

Setiscapella subulata (L.) Barnhart	Reported Torreya **22**:43–49. Determination verified by Dr. J. H. Barnhart. Ronkonkoma, 6/6/21. Long Pond, Wading River, 6/19/21, 7/21/23. Central Islip, 9/14/21. All pine barrens, sandy shores and swamps.
Setiscapella subulata (L) Barnhart forma *cleistogama* (Gray) N. comb. *Setiscapella cleistogama* (A. Gray) Barnhart of The Illustrated Flora.	

Late in September 1923, the writer found a large colony of these plants growing on the sandy shore of Long Pond, Wading River where earlier in the season in former years typical *Setiscapella subulata* grew. The plants varied from 1 to 3 cm. high with small bluish heads and on the larger ones an occasional small yellow flower. The writer did not realize that this was the *Setiscapella cleistogama* of The Illustrated Flora, but considered it a depauperate form of *S. subulata* due to the late date combined with an abnormally dry season and unfortunately with this view did not keep the specimens.

For the views of other observers the reader is referred to Fernald Expedition to Nova Scotia; Rhodora 1921 pp. 100-108-142-143-169-291; Bull. Torrey Bot. Club, June 1915. Bicknell, Flora of Nantucket. Flora of Southern New Jersey, Witmer Stone.

RUBIACEAE. Madder Family

Galium verum L.	Kings Park. Waste field. Adventive from Europe.
" *cruciatum*	Easthampton. Roadside. Adventive from Europe.

CAPRIFOLIACEAE. Honeysuckle Family

Lonicera sempervirens L.	South Hempstead. Woods.
" *japonica* Thunb. var. *flexuosa*	Bayside Woods. Native of Japan.

var. *Morrowi* Gray — Kissena Flushing. Border of swamp. Native of Japan.

" *Standishii* — Roslyn. Hilly woods. Native of China. Only escape known to Mr. Alfred Rehder of the Arnold Arboretum who kindly named the last three species.

LOBELIACEAE. Lobelia Family

Lobelia Dortmanna L. — Riverhead. Great Pond. In profusion in 6 inches to a foot of water on white sand bottom.

CICHORIACEAE. Chicory Family

Nabalus altissimus (L.) Hook. — Roslyn. Border hilly woods. One colony.

Hieracium venosum L.

" *marianum* Willd.

The typical *H. venosum* of the manuals, a slender, almost glabrous plant with few stem leaves is wide-spread on Long Island in shady woodlands. In more open dry and sterile pine barrens what the writer believes is the same species is more pubescent and rougher and on the open rolling wind-swept downs at Montauk, the plant varies from almost typical *venosum* through almost every possible gradation to almost typical *marianum* of the manuals, leafy and with long pilose hairs on stem and leaves, floccose pubescence and abundant glands on stem and inflorescence. In the Hither Woods, Montauk, a mile from the open downs and separated by the depression of Fort Pond, the writer has found typical woodland *H. venosum*.

Mr. E. P. Bicknell has kindly examined these Montauk plants and describes them as intermediate in varying degree between *H. venosum* and *H. marianum*, one plant being quite typical *marianum*, and as being similar to the plants of Nantucket found on open ground. On Nantucket, Mr. Bicknell found no typical *venosum*. For a complete description of the Nantucket plants, see Bulletin Torrey Bot. Club **42**: 552–3.

Dr. F. W. Pennell examined most of the Montauk plants and named them *venosum*. He doubted that *marianum* occurred in our area.

Mr. K. K. Mackenzie has written the writer that he doubts there is such a species as *marianum* and that all he has seen so named were referable to *venosum* or *scabrum*. One of the Montauk plants closest to *venosum* was sent to Mr. Mackenzie who called it unquestionably *venosum*.

"Flora of the Vicinity of Washington" does not record *Hieracium marianum*, only *H. venosum*.

In "Plants of Southern New Jersey" Dr. Witmer Stone writes of *Hieracium marianum:* "These plants are very unsatisfactorily identified. While extreme examples fit the description of *H. marianum* others seem to be *H. venosum* with one or two stem leaves. The veining does not seem an important matter as many plants from the pine barrens have uniformly green leaves and they also show a great variation in pubescence."

"From the material on hand I cannot see any clear cut line of separation between the two and possibly we do not have *marianum* at all."

The writer has reached the conclusion from his own field experience and from the variations recorded by others as condensed in this article, that all of these plants are forms of one species quite sensitive to environment and all should be named *venosum* or *marianum* according to which name has priority.

In the writer's experience typical *venosum* is a plant of woods protected from wind and sun. In the more open pine barren woods it is a rougher, more pubescent plant.

On the flat or rolling downs at Montauk it occurs on windswept hills and open plains and the more or less protected hollows, often shielded by thickets and varies as described above from nearly typical *venosum* to *marianum* of the manuals.

The writer has seen *Solidago rugosa* and *S. altissima* in shady woods, slender and almost glabrous. The same species in the open are very pubescent and rough in varying degree.

COMPOSITAE. Thistle Family

Eupatorium Torreyanum Short	Hempstead Plains, Garden City. Many colonies.
	Montauk. Open downs. One colony.

Eupatorium rotundifolium L. Hempstead Plains, Garden City. Small colony.

Long Pond, Wading River. Two small colonies opposite shores of pond.

Eupatorium sessilifolium L. North of Kew Gardens. Rich hilly woods. Single colony.

Solidago arguta Ait. Woods north of Wyandanch. Colony of three plants. The only plants the writer has seen. Mr. E. P. Bicknell wrote that he had found the basal leaves in hilly woods at Roslyn west side of Hempstead Harbor.

A Study on the Effect of Evaporation and Light on the Distribution of Lichens

CHARLES C. PLITT AND LOUIS J. PESSIN

An investigation has recently been completed of the effect of climatic conditions on the distribution of *Polypodium polypodioides* in Mississippi by the junior writer. It was found that the evaporating power of the air plays the main rôle in determining the distribution of this epiphytic fern. The intensity of the light, the humidity of the air, the temperature in the immediate vicinity of the tree and the temperature of the bark to which the fern was attached exerted only an indirect influence on the occurrence of this polypody.*

The aim of the present paper is to give the results obtained from a study of the effect of certain climatic conditions on the distribution of the lichens on a tree on Mt. Desert Island, Maine, Lat. 44°26′ N. The writers sought to determine what correlation exists between the evaporating power of the air, the intensity of the light, and the distribution of the lichens along the height of the tree and around its circumference.

A tree (*Quercus rubra*) a little over thirteen meters in height and about one-half meter in diameter at two meters from the ground was selected for the investigation. The tree was located in a rather dense woods in the immediate vicinity of the Harpswell Laboratory. A small part of this oak projected above the tops of the neighboring trees. From the base to the top of tree, zones, about a meter apart, were measured off vertically along the tree. In each individual zone a careful study of the lichen flora was made. Three of the zones were selected for the study of the climatic conditions. These were located at 1 to 2 meters, 5.5 to 6.5 meters, and 9 to 10 meters above ground. In each of three selected zones a white, spherical, porous-cup atmometer was set up on the northeast, northwest, and south sides. Evaporation was recorded once a day, generally at nine o'clock in the morning. At these stations the light intensity was also measured. Light readings were usually made at nine and eleven

* This paper will appear in ECOLOGY within the year.

in the morning, and two and four in the afternoon by means of a "Wynne Photographic Exposure Meter." The observations began July 10th, 1923, and ended August 23d of the same year. Thus, records were obtained during forty-three consecutive days.

The different species of lichens are indicated in "Table I" together with the evaporation and the light measurements obtained for the different stations in each zone. It will be noted that the stations in the table are arranged according to the evaporation rates for each station.

It is realized that the ectinometer is not especially suitable for measuring the light intensity, since the rays that act on the photographic paper are not the ones that affect the main activities of the plant. It may be sufficiently accurate for our purpose since it gives the comparative light intensity of two regions for the kind of light it records. The readings obtained by means of this instrument were compared with those obtained in direct sunlight. It was found that it took four seconds (the average of four tests) to change the color of the photographic paper, when the ectinometer was exposed four times at noon to direct sunlight. Four seconds were then regarded as the standard or maximum light intensity. All the other readings obtained were computed as percentage of the intensity of the light in the open.

TABLE I

RELATION OF EVAPORATION AND LIGHT TO THE DISTRIBUTION OF LICHENS ON THE TRUNK OF QUERCUS RUBRA

Station	Exposure	Lichen	Evaporation	Light
1 to 2 m. from ground I	Northwest	*Conotrema urceolata* *Pertusaria multipuncta*	427.62 c.c. in 43 days	6.2%
1 to 2 m. from ground II	South	*Buellia parasema* *Lecanora albella* *Lecidea vernalis* *Leptogium tremelloides* *Lobaria pulmonaria* *Parmelia* sp. *Pertusaria amara*	432.13 c.c. in 43 days	13.5%

1 to 2 m. from ground	Northeast	*Buellia parasema* *Conotrema urceolata* *Lecanora subfusca*	435.12 c.c. in 43 days	10.6%
III		*Parmelia* sp. *Pertusaria amara*		
5.5 to 6.5 m. from ground	South	*Arthonia radiata* *Buellia parasema* *Parmelia caperata* *Parmelia* sp. *Parmelia physodes*	477.31 c.c. in 43 days	29.7%
IV		*Pertusaria multipuncta* *Usnea florida* *Usnea hirta*		
5.5 to 6.5 m. from ground	Northeast	*Arthonia radiata* *Buellia parasema* *Lecanora albella*	489.56 c.c. in 43 days	19.8%
V		*Parmelia sulcata* *Ramalina canaliculata*		
5.5 to 6.5 m. from ground	Northwest	*Arthonia radiata* *Conotrema urceolata* *Lecanora albella* *Lecanora varia*	495.33 c.c. in 43 days	19.8%
VI		*Parmelia conspurcata* *Parmelia* sp. *Ramalina canaliculata*		
9 to 10 m. from ground	South	*Buellia parasema* *Lecanora subfusca* *Parmelia conspurcata* *Parmelia sulcata* *Pertusaria multipuncta*	717.63 c.c. in 43 days	50.1%
VII		*Ramalina canaliculata* *Usnea florida* *Usnea hirta*		
9 to 10 m. from ground	Northeast	*Buellia parasema* *Lecanora subfusca* *Parmelia conspurcata* *Parmelia sulcata* *Pertusaria multipuncta*	734.7 c.c. in 43 days	41.3%
VIII		*Ramalina canaliculata* *Usnea florida* *Usnea hirta*		

9 to 10 m. from ground	Northwest	*Buellia parasema*	764.64 c.c. in 43 days	55%
		Lecanora subfusca		
		Parmelia conspurcata		
		Parmelia tiliacea		
		Parmelia sulcata		
	IX	*Pertusaria multipuncta*		
		Ramalina canaliculata		
		Usnea florida		
		Usnea hirta		
		Xanthoria parietina		

A study of the table seems to suggest that it is the evaporating power of the air that most affects the distribution of the lichens on the tree. It is true that there is some correlation between the intensity of the light and the distribution of the lichens, but this correlation is not as definite as that existing between the plant distribution found and the evaporating power of the air. It seems quite evident even from the limited data, thus far gathered that evaporation plays the chief rôle in limiting the distribution of the lichens. Accepting this as a fact one can arrange the lichens found on this tree into four groups: Group I would include those lichens which inhabit only regions of relatively low evaporation. Thus, *Lecidea vernalis*, *Leptogium tremelloides*, *Lobaria pulmonaria* and *Pertusaria amara* would fall in this group. Into Group II would fall such lichens which inhabit regions of moderate evaporation. This group would include *Conotrema urceolata*, *Arthonia radiata*, *Lecanora albella*, *Parmelia caperata*, *Parmelia physodes*, and *Lecanora varia*. Into Group III would fall those lichens which are able to withstand dry conditions, and are found only in regions of high evaporation. Lichens included in this group are *Pertusaria multipuncta*, *Lecanora subfusca*, *Parmelia conspurcata*, *Parmelia tiliacea*, *Ramalina canaliculata*, *Usnea florida*, *Usnea hirta* and *Xanthoria parietina*. Group IV includes those lichens which seem to show no preference and are found in regions of high evaporation as well as in regions of low evaporation such as *Buellia parasema*.

LIST OF LICHENS FOUND ON QUERCUS RUBRA AND THEIR DISTRIBUTION

Arthonia radiata (Pers.) Th. Fr.

The lowest level at which this lichen was found was about four meters above ground in the northeast zone. No trace of it was found above eight meters from the ground.

Buellia parasema (Ach.) Th. Fr.

The occurrence of this lichen began at one meter above ground, and from there on, it was distributed abundantly all over the tree. More than one hundred patches of this lichen were counted from the lower portion of the tree to the top.

Candelaria concolor (Dicks.) Wainio.

Only two patches of this species were found on the tree. Both were on the south side of the tree, and both just where a branch extended out from the trunk.

Conotrema urceolata (Ach.) Tuck.

This is perhaps the best represented species on the tree. In ascending the tree it was first found at one meter above ground on the north side of the tree. At first only small patches of it were present, but the higher one climbed the larger and more abundant became the patches of this lichen. From about seven meters above ground, the lichen became less and less abundant, so that at about eight meters from the ground there was no trace of it left. Apparently this lichen is an ombrophilous form, for it is found exclusively on the shady side of the tree in the northeast to northwest zones.

Lecanora albella (Pers.) Ach.

At about two meters from the ground only a small patch of this lichen was found. At about four meters from the ground it began to appear abundantly competing, as it were, with *Conotrema*. Higher up the patches became more abundant. At about eight meters from the ground it reached its maximum distribution. Two meters above that this lichen did not appear.

Lecanora subfusca (L.) Ach.

Over thirty patches of this lichen were counted beginning above the lower third of the tree. This lichen occurred on all sides, and was especially abundant on the upper third of the tree.

Lecanora varia (Ehrh.) Ach.

Only two patches of this species were found. Both were on the upper third of the trunk.

Lecidea vernalis (L.) Ach.

One small patch of this lichen was found on the south side of the tree at about two meters from the ground.

Leptogium tremelloides (L.) Gray.

Near the base of the tree this lichen was very abundant. At one meter above ground practically no trace of it was left.

Lobaria pulmonaria (L.) Hoffm.

The distribution of this species is similar to that of *Leptogium* but it was not quite as abundant.

Parmelia sp.

This species was practically all over the tree. Although so abundant, it was impossible to decide upon the species, for everywhere it seemed to be in a juvenile condition.

Parmelia caperata (L.) Ach.

One large specimen of this lichen was found on the upper third of the trunk on the south side.

Parmelia conspurcata (Schaer.) Wainio.

A few patches of this lichen were found on the upper third of the trunk. No preference to any particular side was evident.

Parmelia physodes (L.) Ach.

Only one patch of this form was found at about seven meters from the ground, on the south side of the tree.

Parmelia rudecta Ach.

One patch only of this species was found, at about eight meters from the ground, on the northeast side of the trunk.

Parmelia saxatilis (L.) Ach.

This form had a similar distribution to *Parmelia rudecta*.

Parmelia sulcata Tayl.

More than fifteen patches of this lichen were found on the upper quarter of the tree.

Parmelia tiliacea (Hoffm.) Ach.

One specimen of it only was found, near the very top of the tree.

Pertusaria amara (Ach.) Nyl.

A few specimens of this lichen were found on the north side of the tree between one and two meters from the ground.

Pertusaria multipuncta (Turn.) Nyl.

This lichen was most abundant on the upper half of the tree. No preference for any particular side of the tree was apparent.

Physcia stellaris (L.) Nyl.

Several specimens of this lichen were found on the tree. There seemed to be no definite distribution.

Pyrenula nitida (Schrad.) Ach.

One specimen of this lichen was found at about six meters from the ground on the northwest side of the tree.

Ramalina canaliculata Fr.

This lichen was found only in the upper half of the tree. At first a very few depauperate specimens were found, but at the upper third of the tree the lichen was very abundant. Possibly the patches on the lower part of the tree were washed down by the rains from above.

Ramalina farinacea (L.) Ach.

A small patch of this was found on the upper third of the tree on the south side.

Usnea florida (L.) Hoffm.

The distribution of this lichen was very similar to that of *Ramalina canaliculata*.

Usnea hirta (L.) Hoffm.

This lichen was found in abundance in the same regions on the tree inhabited by *U. florida*.

Xanthoria parietina (L.) Fr.

One patch of this form was found near the very top of the tree on the northwest side.

SUMMARY

1. The evaporating power of the air was found to be different at the different sides and heights of the tree.

2. The evaporating power of the air seems to be the condition which most affects the distribution of the lichens.

3. Certain lichens may be restricted to certain heights or sides of the trunk. Their restriction depends on the evaporation rates at those regions.

4. Some lichens seem to have no restrictive distribution, and occur all along the height of the tree, on any side.

5. Some lichens seem to show preference for the north side; others for the south side.

6. Marked illustration of restriction is shown by *Leptogium tremelloides*, *Pertusaria amara*, and *Lobaria pulmonaria*. These occur only in regions of low evaporation.

7. *Usnea* and *Ramalina* occur only in regions where light is intense. The high evaporation in those regions does not seem to affect their distribution.

In conclusion it may be stated that although these results should be regarded as preliminary ones, it is safe to say that this method of investigation opens up an interesting phase in the study of epiphytes, for in two different regions (in Mississippi and in Maine) and in two diverse types of plants (a fern and lichen) the investigation brings out similar results.

The writers are indebted to Professors Duncan S. Johnson and Burton E. Livingston for the loan of the apparatus used. Thanks are especially due to Professor Ulric Dahlgren, Director of Harpswell Laboratory, for offering to the writers the facilities of the laboratory. Finally, acknowledgments should be made to Mr. A. F. Skutch who cared for the apparatus and made the records after the writers left the laboratory.

INDEX TO AMERICAN BOTANICAL LITERATURE

1923

The aim of this Index is to include all current botanical literature written by Americans, published in America, or based upon American material; the word America being used in the broadest sense.

Reviews, and papers that relate exclusively to forestry, agriculture, horticulture, manufactured products of vegetable origin, or laboratory methods are not included, and no attempt is made to index the literature of bacteriology. An occasional exception is made in favor of some paper appearing in an American periodical which is devoted wholly to botany. Reprints are not mentioned unless they differ from the original in some important particular. If users of the Index will call the attention of the editor to errors or omissions, their kindness will be appreciated.

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November–December, 1923

Allard, H. A. Some possible relationships of the mosaic diseases. Phytopathology **13**: 555–557. 26 D 1923.

Allen, W. E. Statistical studies of marine diatoms of the San Diego region collected by U. S. S. Pioneer in midwinter 1923. Univ. California Publ. Zool. **22**: 445–448. 20 N 1923.

Allison, J. H. Twenty years' growth of planted Norway, Jack, Scotch, and white pine in north central Minnesota. Jour. For. **21**: 796–801. D 1923.

Allison, R. V. & Shive, J. W. Studies on the relation of aeration and continuous renewal of nutrient solution to the growth of soybeans in artificial culture. Am. Jour. Bot. **10**: 554–566. *pl. 39* + *f. 1, 2.* 31 D 1923.

Anderson, E. G. Maternal inheritance of chlorophyll in maize. Bot. Gaz. **76**: 411–418. *f. 1, 2.* 28 D 1923.

Arber, A. Leaves of the Gramineae. Bot. Gaz. **76**: 374–388. *pl. 28–30.* 28 D 1923.

Ashe, W. W. Further notes on trees and shrubs of the southeastern United States. Bull. Torrey Club **50:** 359–363. 1 D 1923.
Includes new species in *Vaccinium* (1), *Castanea* (3), and *Robinia* (2).

Bailey, I. W. The cambium and its derivative tissues. IV. Am. Jour. Bot. **10:** 499–509. *pl. 36* + *f. 1–3.* 27 N 1923.

Bailey, L. H. Certain cultivated *Rubi.* Gent. Herb. **1:** 139–200. *f. 62–90.* 10 N 1923.
Includes four new species from eastern North Ameriea.

Baxter, D. V. The genus *Ribes* with reference to the white pine blister rust in the west. Pap. Michigan Acad. Sci., Arts & Lett. **2:** 1, 2. 2 D 1923.

Benedict, R. C. Ruffling as a distinct type of leaf variation. Am. Fern Jour. **13:** 128–131. *pl. 4.* 21 Ja 1924.

Benedict, R. C. Variations in the dagger fern. Am. Fern Jour. **13:** 124–126. 21 Ja 1924.
Observations of *Polystichum* near Meyersdale, Pennsylvania.

Blake, S. F. Many-spiked lycopods. Am. Fern Jour. **13:** 126–128. 21 Ja 1924.

Blake, S. F. New botanical names. Proc. Biol. Soc. Washington **36:** 200. 19 D 1923.

Blakeslee, A. F., Belling, J., & Farnham, M. E. Inheritance in tetraploid Daturas. Bot. Gaz. **76:** 329–373. 28 D 1923.

Blakeslee, A. F., & Farnham, M. E. Trisomic inheritance in the Poinsettia mutant of *Datura.* Am. Nat. **57:** 481–495. *f. 1.* D 1923.

Blodgett, F. M. Time-temperature curves for killing potato tubers by heat treatment. Phytopathology **13:** 465–475. *f. 1–3.* 9 N 1923.

Bowman, H. H. M. The distribution and pollination of certain sea-grasses. Pap. Michigan Acad. Sci., Arts & Lett. **2:** 3–10. *pl. 1–4* + *f. 1, 2.* 2 D 1923.

Boynton, K. R. *Alstroemeria aurantiaca.* Addisonia **8:** 33. *pl. 273.* 10 N 1923.
Native of Chile.

Boynton, K. R. *Swainsona galegifolia.* Addisonia **8**: 43, 44. *pl. 278.* 10 N 1923.
Native of Australia.

Brannon, J. M. Influence of glucose and fructose on growth of fungi. Bot. Gaz. **76**: 257–273. 10 D 1923.

Breazeale, J. F. The absorption of carbon by the roots of plants. Jour. Agr. Research **26**: 303–312. 17 N 1923.

Briggs, F. N. The toxicity of copper sulfate to the spores of *Tilletia Tritici* (Bjerk.) Winter. Univ. California Publ. Agr. Sci. **4**: 407–412. *f. 1.* 20 N 1923.

Britton, E. G. Cultivation of the fringed gentian. Jour. New York Bot. Gard. **24**: 258, 259. N 1923. [Illust.]

Britton, N. L. *Bignonia radicans.* Addisonia **8**: 39, 40. *pl. 276.* 10 N 1923.

Britton, N. L. *Phlebotaenia Cowellii.* Addisonia **8**: 47, 48. *pl. 280.* 10 N 1923.

Britton, N. L., & Rose, J. N. The Cactaceae. Descriptions and illustrations of plants of the Cactus family. IV. Publ. Carnegie Inst. Washington 248[4]: i–viii. 1–318. *pl. 1–37* + *f. 1–262.* 24 D 1923.
Includes 11 new genera and 67 new species, all American.

Brownell, L. W. The shagbark hickory. Nat. Mag. **2**: 296–298. N 1923.

Burnham, S. H. Supplementary list of the ferns of the Lake George flora, New York. Am. Fern Jour. **13**: 109–113. 21 Ja 1924.

Campbell, D. H. Australasian botanical notes. III. New Zealand. Am. Jour. Bot. **10**: 515–536. *pl. 37* + *f. 1–6.* 31 D 1923.

Chapman, H. H. The recovery and growth of loblolly pine after suppression. Jour. For. **21**: 709–711. N 1923.

Cleland, R. E. Chromosome arrangements during meiosis in certain Oenotheras. Am. Nat. **57**: 562–566. *f. 1–14.* D 1923.

Clements, F. E., & Long, F. L. Experimental pollination. An outline of the ecology of flowers and insects. Carnegie Inst. Washington Publ. 336: 1–274. *pl. 1–17.* 6 N 1923.

Cook, M. T. Early stages of crown gall. Phytopathology **13:** 476–482. *f. 1–14.* 9 N 1923.

Cook, O. F. *Pseudophoenix insignis*, a new palm from Haiti, and two other new species from the West Indies. Jour. Washington Acad. Sci. **13:** 397–408. *f. 1.* 4 N 1923.
Three new species of *Pseudophoenix* from the West Indies.

Crawford, R. F. Fungi isolated from the interior of cotton seed. Phytopathology **13:** 501–503. 9 N 1923.

Davis, B. M. Pollen- and seed-sterility in hybrids. Am. Jour. Bot. **10:** 462–467. 27 N 1923.

Dickson, J. G., Eckerson, S. H., & Link, K. P. The nature of resistance to seedling blight of cereals. Proc. Nat. Acad. Sci. **9:** 434–440. *f. 1–4.* 15 D 1923.

Doran, W. L. Toxicity studies with some copper fungicides. Phytopathology **13:** 532–542. 26 D 1923.

Dorsey, M. J. Sterility in relation to horticulture. Am. Jour. Bot. **10:** 474–484. 27 N 1923.

Eames, A. J., & Wiegand, K. M. Variations in *Trillium cernuum*. Rhodora **25:** 189–191. 4 D 1923.

East, E. M. Genetical aspects of self- and cross-sterility. Am. Jour. Bot. **10:** 468–473. 27 N 1923.

Ellis, M. M., & Eyster, W. H. Some effects of insulin and glucokinin on maize seedlings. Science II **58:** 541, 542. 28 D 1923.

Evans, A. W. Notes on the Hepaticae of California. Proc. California Acad. Sci. **13:** 111–130. 6 N 1923.

Evans, A. W. Notes on North American Hepaticae—X. Bryologist **26:** 55–67. N 1923.
Includes *Bazzania nudicaulis*, sp. nov., from North Carolina.

Evans, A. W. Second revised list of New England Hepaticae. Rhodora **25:** 192–199. 4 D 1923.

Fahmy, T. The production by *Fusarium Solani* of a toxic excretory substance capable of causing wilting in plants. Phytopathology **13**: 543–550. 26 D 1923.

Farwell, O. A. Notes on the Michigan flora—V. Pap. Michigan Acad. Sci., Arts & Lett. **2**: 11–46. D 1923.
Includes *Lethea Cahnae*, sp. nov.

Fisher, G. C. A common name for *Phacelia Purshii*. Torreya **23**: 106. D 1923.

Fulmer, E. I., & Grimes, M. The growth of yeasts on synthetic agar media. Jour. Bact. **8**: 585–588. N 1923.

Gaiser, L. O. Intracellular relations of aggregate crystals in the spadix of *Anthurium*. Bull. Torrey Club **50**: 389–398. 24 Ja 1924.

Gates, F. C. Extensions of range in the Douglas Lake region, Cheboygan County, Michigan. Pap. Michigan Acad. Sci., Arts. & Lett. **2**: 47, 48. D 1923.

Gerry, E. Five molds and their penetration into woods. Jour. Agr. Research **26**: 219–230. *pl. 1–4*. 3 N 1923.

Gleason, H. A. Botanical observations in northern Michigan. Jour. New York Bot. Gard. **24**: 273–283. N 1923.

Glock, W. S. Algae as limestone makers and climatic indicators. Am. Jour. Sci. **206**: 377–408. N 1923.

Gustafson, F. G. Studies on the hydrogen ion concentration of plant juices. Pap. Michigan Acad. Sci., Arts & Lett. **2**: 49–52. *f. 3*. D 1923.

Haasis, F. W. Significance of a 255-year age class in an eastern Kentucky forest. Jour. For. **21**: 700–704. N 1923.

Hale, J. D. The bars or rims of Sanio. Bot. Gaz. **76**: 241–256. *pl. 24–26* + *f. 1–5*. 10 D 1923.

Hansen, A. A. Fringed gentian (*Gentiana crinita*). Nat. Mag. **2**: 357, 358, 363. D 1923. [Illust.]

Hansen, T. S. Current growth in Norway pine. Jour. For. **21**: 802–806. D 1923.

Harter, L. L., & Weimer, J. L. Some physiological variations in strains of *Rhizopus nigricans*. Jour. Agr. Research **26:** 363–372. 24 N 1923.

Hauman, L. Un viaje botanico desde Embarcación a Yacuiba [Argentina]. Physis **7:** 134. 12 D 1923.

Hauman, L. Notes sur le saule sud-americain et sur la valeur des espéces botaniques de Molina. Physis **7:** 67–81. *pl. 1, 2.* 12 D 1923.

Herre, A. W. C. T. *Cordyceps Sphingium* (Schw.) in the Philippines. Mycologia **15:** 280, 281. *f. 1.* 21 D 1923.

Hitchcock, A. S. New species of grasses from South America. Proc. Biol. Soc. Washington **36:** 195–198. 19 D 1923.
New species in *Bromus* (1), *Lamprothyrsus* (1), *Stipa* (2), and *Chloris* (1).

Hitchcock, A. S. Sodiro herbarium. Science II **58:** 465. 7 D 1923.

Hitchcock, A. S. Type species of the first 100 genera of Linnaeus' Species Plantarum. Am. Jour. Bot. **10:** 510–514. 27 N 1923.

Hoagland, D. R., & Martin, J. C. A comparison of sand and solution cultures with soil as media for plant growth. Soil Sci. **16:** 367–388. N 1923.

Hollick, A. *Menispermum canadense.* Addisonia **8:** 41, 42. *pl. 277.* 10 N 1923.

Holzinger, J. M., & Bartram, E. B. The genus *Crossidium* in North America. Bryologist **26:** 67–72. *pl. 5, 6.* N 1923.

Hotson, J. W., & Hartge, L. A disease of tomato caused by *Phytophthora mexicana*, sp. nov. Phytopathology **13:** 520–531. *pl. 22, 23 + f. 1.* 26 D 1923.

Hoyt, W. D. Some aspects of the relation of species to their environment. Science II **58:** 432–434. 30 N 1923.

Humphrey, C. J. Decay of lumber and building timbers due to *Poria incrassata* (B. & C.) Burt. Mycologia **15:** 258–277. *pl. 28–30.* 21 D 1923.

Ihering, H. V. Der periodische Blattwechsel der Bäume im tropischen und subtropischen Südamerika. Bot. Jahrb. Syst., Pflanzengesch. u. Pflanzengeog. **58:** 524–598. 1 N 1923.

Jennings, O. E. Elias Judah Durand. Bryologist **26:** 67. N 1923.

Jones, E. S. Taxonomy of the *Sclerotinia* on *Helianthus annuus* L. Phytopathology **13:** 496–500. *f. 1.* 9 N 1923.

Jones, F. M. "The most wonderful plant in the world." Nat. Hist. 23: 589–596. D 1923. [Illust.]
Dionaea muscipula.

Kauffman, C. H. The genus *Armillaria* in the United States and its relationships. Pap. Michigan Acad. Sci., Arts & Lett. **2:** 53–68. *pl. 5–9.* D 1923.

Kempton, J. H. Heritable characters of maize. XVI. Dead leaf margins. Jour. Hered. **14:** 349–351. *f. 5, 6.* 17 D 1923.

Kittredge, J., & Belyea, H. C. Reproduction with fire protection in the Adirondacks. Jour. For. **21:** 784–787. D 1923.

Lachmund, H. G. Bole injury in forest fires. Jour. For. **21:** 723–731. *f. 1.* N 1923.

Lachmund, H. G. Relative susceptibility of incense cedar and yellow pine to bole injury in forest fires. Jour. For. **21:** 815–817. D 1923.

LaRue, C. D. *Helminthosporium Heveae* in Sumatra. Phytopathology **13:** 483–487. 9 N 1923.

LaRue, C. D. Two unreported parasites of *Hevea brasiliensis.* Pap. Michigan Acad. Sci., Arts & Lett. **2:** 69–72. D 1923.

LaRue, C. D., & Bartlett, H. H. *Diplodia* disease of *Hevea brasiliensis.* Pap. Michigan Acad. Sci., Arts & Lett. **2:** 91–108. D 1923.

LaRue, C. D., & Bartlett, H. H. A leaf-fall disease of *Hevea brasiliensis* Muell.-Arg. due to *Gloeosporium alborubrum* Petch. Pap. Michigan Acad. Sci., Arts & Lett. **2:** 73–90. D 1923.

Lee, H. A. Gum diseases of sugar cane in the Philippines. Phytopathology **13**: 504. 9 N 1923.

Lewis, F. J., & Tuttle, G. M. On the phenomena attending seasonal changes in the organization in leaf cells of *Picea canadensis* (Mill.) B. S. P. New Phytol. **22**: 225–232. 1 D 1923.

Longley, A. E. Cytological studies in the genera *Rubus* and *Crataegus*. Am. Nat. **57**: 568, 569. D 1923.

Lund, E. J. Electrical control of organic polarity in the egg of *Fucus*. Bot. Gaz. **76**: 288–301. *pl. 27 + f. 1, 2.* 10 D 1923.

Lutman, B. F. Further observations on the osmotic pressure of the juices of the potato plant. Jour. Agr. Research **26**: 243–256. 10 N 1923.

Mackay, A. H. Diatoms of Nova Scotia; collected by Alexander Howard Mackay and determined, distributed and lists published by J. Tempère and H. and M. Peragallo, Paris, France. Proc. & Trans. Nova Scotia Inst. Sci. **15**: 175–188. 1 N 1923.

Mackay, A. H. The phenology of Nova Scotia, 1920. Proc. & Trans. Nova Scotia Inst. Sci. **15**: 153–160. 1 N 1923.

Mackay, A. H. The phenology of Nova Scotia, 1921. Proc. & Trans. Nova Scotia Inst. Sci. **15**: 189–196. 1 N 1923.

Mackenzie, K. K. Notes on Carex—XIII. Bull. Torrey Club **50**: 343–358. 1 D 1923.

Includes *Carex plana*, sp. nov., from New York, and *C. brachyglossa*, sp. nov., from Pennsylvania.

McKinney, H. H. Influence of soil temperature and moisture on infection of wheat seedlings by *Helminthosporium sativum*. Jour. Agr. Research **26**: 195–218. *pl. 1–4.* 3 N 1923.

Mamelide Calvino, E. The direct assimilation of free nitrogen by plants. Torreya **23**: 99–104. D 1923.

Menaul, P. A chemical analysis of *Jatropha stimulosa*. Jour. Agr. Research **26**: 259, 260. 10 N 1923.

Merrill, E. D. Die pflanzengeographische Scheidung von Formosa und den Philippinen. Bot. Jahrb. Syst., Pflanzengesch. u. Pflanzengeog. **58**: 599–604. 1 N 1923.

Molfino, J. F. Notas botanicas—II. Physis **7**: 89–105. 12 D 1923.

Morton, J. N. Wild black cherry in northern Pennsylvania. For. Leaves **19**: 92, 93. D 1923.

Murrill, W. A. Botanical features of Mountain Lake, Virginia. Jour. New York Bot. Gard. **24**: 249–256. N 1923.

Murrill, W. A. Florida Fungi—I. Mycologia **15**: 278, 279. 21 D 1923.

Namikawa, I. Growth of pollen tubes in self-pollinated apple flowers. Bot. Gaz. **76**: 302–310. *f. 1–10.* 10 D 1923.

Nichols, G. E. *Cercis canadensis* in Connecticut. Rhodora **25**: 203, 204. 4 D 1923.

Norton, G. F. How to have fringed gentians. Jour. New York Bot. Gard. **24**: 256–258. N 1923.

Penland, C. W. T. Cytological behavior in *Rosa*. Bot. Gaz. **76**: 403–410. *pl. 31, 32.* 28 D 1923.

Perry, W. J. Mistletoe—the insidious enemy of trees. Am. For. **29**: 748, 749. D 1923. [Illust.]

Pittier, H. Note on plants collected in tropical America. Jour. Washington Acad. Sci. **13**: 428–431. 19 N 1923.

Pool, R. J. Xerophytism and comparative leaf anatomy in relation to transpiring power. Bot. Gaz. **76**: 221–240. *pl. 20–23.* 10 D 1923.

Recknagel, A. B. Growth of white spruce in the Adirondacks. Jour. For. **21**: 794, 795. D 1923.

Rehder, A. New species, varieties and combinations from the herbarium and the collections of the Arnold Arboretum. Jour. Arnold Arb. **4**: 107–116. 8 My 1923; 246–253. 19 N 1923.

Rhoads, A. S. Notes on the failure of grapevines to set fruit and in shelling. Phytopathology **13**: 513–519. *pl. 21.* 26 D 1923.

Richey, F. D. Defective seeds in maize—an ancient character. Jour. Hered. **14**: 359, 360. *f. 12.* 17 D 1923.

Robbins, W. J., & Maneval, W. E. Further experiments on growth of excised root tips under sterile conditions. Bot. Gaz. **76**: 274–287. *f. 1–3.* 10 D 1923.

Rogers, W. E. Resistance of trees to ice-storm injury. Torreya **23**: 95–99. D 1923. [Illust.]

Rose, J. N. *Dudleya arizonica.* Addisonia **8**: 35. *pl. 274.* 10 N 1923.

Rose, J. N. *Hamatocactus setispinus.* Addisonia **8**: 45, 46. *pl. 279.* 10 N 1923.

Rydberg, P. A. Genera of North American Fabaceae. I. Tribe Galegeae. Am. Jour. Bot. **10**: 485–498. *pl. 33–35.* 27 N 1923.
Includes *Daubentoniopsis*, gen. nov.

Rydberg, P. A. *Rosa palustris.* Addisonia **8**: 37, 38. *pl. 275.* 10 N 1923.

Schallert, P. O. Notes on a new rose-flowered *Robinia* from South Carolina. Torreya **23**: 104, 105. D 1923.
Robinia Ashei, sp. nov.

Schmitz, H. Leafcast of *Larix occidentalis* by *Hypodermella Laricis* Tubeuf. Phytopathology **13**: 505, 506. *f. 1.* 9 N 1923.

Schneider, C. Notes on hybrid *Berberis* and some garden forms. Jour. Arnold Arb. **4**: 193–232. 19 N 1923.

Schrader, F. The origin of the mycetocytes in *Pseudococcus.* Biol. Bull. **45**: 279–302. *pl. 1–3.* D 1923.
Treats of the parasitism of Fungi in a Homopterous insect.

Seifriz, W. Reaction of protoplasm to salts and antagonistic action of salts and alcohol. Bot. Gaz. **76**: 389–402. 28 D 1923.

Sherwood, E. C. Hydrogen-ion concentration as related to the *Fusarium* wilt of tomato seedlings. Am. Jour. Bot. **10**: 537–553. *pl. 38*. 31 D 1923.

Shamel, A. D., Pomeroy, C. S., & Caryl, R. E. Bud selection as related to quantity production in the Washington navel orange. Jour. Agr. Research **26**: 319–322. *pl. 1, 2*. 17 N 1923.

Smith, C. P. Studies in the genus *Lupinus*—IX. Bull. Torrey Club **50**: 373–388. 24 Ja 1924.

Smith, H. B. Stomatal behavior of plants in the greenhouse in winter. Pap. Michigan Acad. Sci., Arts & Lett. **2**: 109–117. D 1923.

Smith, R. W., Waldron, L. R. & Clark, J. A. Improvement of Kubanka durum wheat by pure-line selection. U. S. Dept. Agr. Dept. Bull. 1192: 1–14. *f. 1–4*. N 1923.

Spegazzini, C. Nota sobre el Alpa-sandia. Physis **7**: 135–138. 12 D 1923.
Dioscorea microbotrya Griseb. of Argentina.

Standley, P. C. New species of plants from Salvador. II. Jour. Washington Acad. Sci. **13**: 436–443. 4 D 1923.
Cashalia, gen. nov., and new species in *Piper* (1), *Cucatlania* (1), *Capparis* (1), *Sedum* (1), *Prunus* (1), *Acacia* (1), *Pithecollobium* (1), *Apalatoa* (1), *Cashalia* (1), and *Amerimnon* (1).

Stapf, O. *Maxillaria chrysantha*. Curtis Bot. Mag. **149**: *pl. 8979*. 26 N 1923. [with text.]
Species of Orchidaceae from Brazil.

Stapf, O. *Tecophilaea cyanocrocus*. Curtis Bot. Mag. **149**: *pl. 8987*. 26 N 1923. [With text.]
Species of Amaryllidaceae from Chile.

Stout, A. B. The physiology of incompatibilities. Am Jour. Bot. **10**: 459–461. 27 N 1923.

Suksdorf, W. A new saxifrage from Oregon. Torreya 23: 106, 107. D 1923.
Saxifraga Gormani, sp. nov.

Suksdorf, W. Washingtonische Pflanzen III. Werdenda **1:** 1–14. 20 D 1923.

Includes new species in *Festuca* (3), *Elymus* (1), *Sitanion* (1), *Carex* (1), *Stenanthium* (1), *Olsynium* (2), *Polygonum* (1), *Cerastium* (1), *Montia* (2), *Claytonia* (2), and *Lupinus* (2).

Tanaka, T. A brief history of *Citrus* scab in Japan. Phytopathology **13:** 492–495. 9 N 1923.

Thone, F. Evaporation rates on rock canyon walls. Bot. Gaz. **76:** 419–424. *f. 1.* 28 D 1923.

Tisdale, W. H. An effective method of inoculating barley with covered smut. Phytopathology **13:** 551–554. 26 D 1923.

Toumey, J. W. Multiple pine embryos. Bot. Gaz. **76:** 426. *f. 1.* 28 D 1923.

Walker, L. B. Some observations on the development of *Endogone malleola* Hark. Mycologia **15:** 245–257. *pl. 26, 27 + f. 1–3.* 21 D 1923.

Weatherby, C. A. An interesting relic and its owner. Am. Fern Jour. **13:** 114–118. 21 Ja 1924.

Field note-book of ferns of August Fendler.

Webb, R. W., Leighty, C. E., Dungan, G. H., & Kendrick, J. B. Varietal resistance in winter wheat to the rosette disease. Jour. Agr. Research **26:** 261–270. 10 N 1923.

Weimer, J. L. Two diseases of udo (*Aralia cordata* Thunb.). Jour. Agr. Research **26:** 271–278. 10 N 1923.

Welles, C. G., & Roldan, E. F. Another economic host of *Bacterium Solanacearum.* Phytopathology **13:** 488–491. *f. 1, 2.* 9 N 1923.

Wherry, E. T. Ferns of eastern West Virginia—I. Am. Fern Jour. **13:** 104–109. 21 Ja 1924.

Wiegand, K. M. Notes on *Triosteum perfoliatum* and related species. Rhodora **25:** 199–203. 4 D 1923.

Wilson, E. H. The hortensias: *Hydrangea macrophylla* DC. and *Hydrangea serrata* DC. Jour. Arnold Arb. **4:** 233–246. 19 N 1923.

Yamagata, U., & Itano, A. Physiological study of *Azotobacter chroococcum*, *Beijerinckii* and *Vinelandii* types. Jour. Bact. **8**: 521–532. N 1923.